

Attorney Docket No.: IMMR-IMD0002C (434701-067)

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-11. (Cancelled)

12. (Previously Presented) An apparatus, comprising:

a capture mechanism having a coupling mechanism and being configured to engage a peripheral device manipulatable by a user;

a sensing assembly configured to detect movement of the peripheral device when engaged by the capture mechanism;

a dimension-adjusting mechanism configured to adjust the coupling mechanism along a dimension substantially transverse to a direction of movement of the peripheral device when the peripheral device is engaged by the capture mechanism, the dimension-adjusting mechanism configured to cause the adjustment of the coupling mechanism in response to the peripheral device pushing against the dimension-adjusting mechanism in a direction substantially parallel to the direction of movement of the peripheral device when the peripheral device is engaged by the capture mechanism; and

an actuator configured to apply a force to the peripheral device when the peripheral device is engaged by the capture mechanism, wherein the force applied by the actuator is felt by the user manipulating the peripheral device and causes either impeded or enhanced motion of the peripheral device based on the force, the actuator applying the force based on control signals associated with the detected movement of the peripheral device.

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13. (Previously Presented) The apparatus of claim 12, wherein the dimension-adjustment mechanism is configured to automatically adjust the dimension of the coupling mechanism in response to the movement of the peripheral device, the coupling mechanism being configured to couple the peripheral device when engaged by the capture mechanism to the sensor assembly.

14. (Previously Presented) The apparatus of claim 12, the dimension-adjusting mechanism being configured to automatically adjust the dimension of the coupling mechanism, the dimension-adjusting mechanism further including:

an outer tubular-member; and

an inner tubular-member, the inner tubular-member being at least partially disposed within the outer tubular-member and being configured to slide relative to the outer tubular-member in response to a manipulation of the peripheral device, the inner tubular-member being configured to engage the peripheral device at a proximal end of the inner tubular member, the inner tubular-member being coupled to the sensing assembly at a distal end of the inner tubular-member.

15. (Previously Presented) The apparatus of claim 12, wherein the sensing assembly includes:

a first pulley;

a second pulley;

a belt disposed about the first pulley and the second pulley;

a guide rail; and

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a trolley configured to move along the guide rail in response to a corresponding movement of the peripheral device when engaged by the capture mechanism, the belt being configured to move in response to a movement of the trolley.

16. (Previously Presented) The apparatus of claim 12, wherein the sensing assembly includes:

a first pulley;

a second pulley;

a belt disposed about the first pulley and the second pulley;

a guide rail;

a trolley configured to move along the guide rail in response to a corresponding movement of the peripheral device when engaged by the capture mechanism, the belt being configured to move in response to a movement of the trolley;

a rotational-motion sensor configured to measure a rotation of the peripheral device when engaged by the capture mechanism; and

a translational-motion sensor configured to measure a translational-motion of the peripheral device when engaged by the capture mechanism.

17. (Previously Presented) The apparatus of claim 12, wherein the sensing assembly includes:

a first pulley;

a second pulley;

a belt disposed about the first pulley and the second pulley; a guide rail;

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a trolley configured to move along the guide rail in response to a corresponding movement of the peripheral device when engaged by the capture mechanism, the belt being configured to move in response to a movement of the trolley;

a rotational-motion sensor configured to measure a rotation of the peripheral device when engaged by the capture mechanism, the rotational-motion sensor being disposed proximate to the trolley; and

a translational-motion sensor configured to measure a translational-motion of the peripheral device when engaged by the capture mechanism, the translational-motion sensor being coupled to the first pulley.

18. (Previously Presented) The apparatus of claim 12, wherein the sensing assembly includes:

a first pulley;

a second pulley, the actuator being coupled to the second pulley, the actuator being configured to apply force-feedback by controlling a rotation of the second pulley;

a belt disposed about the first pulley and the second pulley;

a guide rail;

a trolley configured to move along the guide rail in response to a corresponding movement of the peripheral device when engaged by the capture mechanism, the belt being configured to move in response to a movement of the trolley;

a rotational-motion sensor configured to measure a rotation of the peripheral device when engaged by the capture mechanism; and

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a translational-motion sensor configured to measure a translational-motion of the peripheral device when engaged by the capture mechanism.

19. (Previously Presented) A method, comprising:

engaging a peripheral device via a capture mechanism having a coupling mechanism; coupling a sensing assembly to the peripheral device while engaged by the capture mechanism; adjusting a transverse dimension of the coupling mechanism in response to a movement of the peripheral device when engaged by the capture mechanism, wherein said adjusting the transverse dimension of the coupling mechanism includes moving a carriage assembly from a first position to a second position and expanding a bellows in response to the movement of the carriage assembly; and

applying force feedback to the peripheral device while engaged by the capture mechanism in response to control signals associated with a simulated medical procedure.

20. (Previously Presented) The method of claim 19, further comprising:

sensing a rotational-motion of the peripheral device; and
sensing a translational-motion of the peripheral device.

21. (Previously Presented) The method of claim 19, further comprising:

sensing a rotational-motion of the peripheral device; and
sensing a translational-motion of the peripheral device, the sensing the translational-motion including sensing a motion of a trolley, the trolley being coupled to the peripheral device.

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22. (Previously Presented) The method of claim 19, comprising applying force feedback to the peripheral device by controlling a rotation of a pulley.

23. (Previously Presented) The method of claim 19, wherein adjusting the dimension includes:

increasing a cross-section of the capture mechanism such that the peripheral device may be removed from the capture mechanism.

24. (Previously Presented) The method of claim 19, wherein the adjusting the dimension of the coupling mechanism includes:

moving an inner tubular-member relative to an outer tubular-member in response to the movement of the peripheral device when engaged by the capture mechanism.

25. (Cancelled)

26. (Previously Presented) An apparatus, comprising:

a capture mechanism having a coupling mechanism and being configured to engage a peripheral device;

a sensing assembly configured to detect movement of the peripheral device when the peripheral device is engaged by the capture mechanism;

a dimension-adjusting mechanism configured to adjust the coupling mechanism along a dimension substantially transverse to a direction of movement of the peripheral device when the peripheral device is engaged by the capture mechanism, the dimension-adjusting mechanism

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configured to move between a first position and a second position in a direction parallel to a direction of movement of the peripheral device when engaged by the capture mechanism, the dimension-adjustment mechanism being configured to support the peripheral device when engaged by the capture mechanism;

an actuator configured to apply force feedback to the peripheral device when engaged by the capture mechanism, the force feedback being based on control signals associated with the detected movement of the peripheral device; and

wherein the sensing assembly further includes a first pulley, a second pulley, a belt disposed about the first pulley and the second pulley, a guide rail, and a carriage assembly coupled to a bellows and being configured to move along the guide rail in response to a corresponding movement of the peripheral device when engaged by the capture mechanism, the belt being configured to move in response to movement of the carriage assembly.

27. (Previously Presented) The apparatus of claim 26, wherein the dimension-adjusting mechanism includes:

an outer tubular-member; and

an inner tubular-member, the inner tubular-member being at least partially disposed within the outer tubular-member and being configured to slide relative to the outer tubular-member in response to a manipulation of the peripheral device, the peripheral device being coupled to the inner tubular-member at a proximal end of the inner tubular-member when the peripheral device is engaged by the capture mechanism, the inner tubular-member being coupled to the sensing assembly at a distal end of the inner tubular-member.

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28. (Previously Presented) The apparatus of claim 26, wherein the dimension-adjustment mechanism includes:

a bellows, the bellows having a plurality of leaves, the plurality of leaves being constructed of a rigid material, each leaf from the plurality of leaves having an aperture configured to receive the peripheral device, the apertures for each leaf from the plurality of leaves being configured to allow the peripheral device to pass through the bellows, the bellows being configured to support the peripheral device.

29. (Cancelled)

30. (Previously Presented) A method, comprising:

providing a capture mechanism having a coupling mechanism and being configured to engage a peripheral device;

providing a sensing assembly configured to detect movement of the peripheral device when engaged by the capture mechanism;

providing a dimension-adjusting mechanism configured to adjust the coupling mechanism along a dimension substantially transverse to a direction of movement of the peripheral device when the peripheral device is engaged by the capture mechanism, the dimension-adjusting mechanism configured to move between a first position and a second position in a direction parallel to a direction of movement of the peripheral device when engaged by the capture mechanism, the dimension-adjustment mechanism being configured to support the peripheral device when engaged by the capture mechanism, wherein said providing a dimension-adjusting mechanism further includes providing a bellows, the bellows having a plurality of

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leaves, the plurality of leaves being constructed of a rigid material, each leaf from the plurality of leaves having an aperture configured to receive the peripheral device, the apertures for each leaf from the plurality of leaves being configured to allow the peripheral device to pass through the bellows, the bellows being configured to support the peripheral device; and

providing an actuator configured to apply force feedback to the peripheral device when engaged by the capture mechanism, the force feedback being based on control signals associated with the detected movement of the peripheral device.

31. (Previously Presented) The method of claim 30, wherein providing the dimension-adjusting mechanism includes:

providing an outer tubular-member; and

providing an inner tubular-member, the inner tubular-member being at least partially disposed within the outer tubular-member and being configured to slide relative to the outer tubular-member in response to a manipulation of the peripheral device, the peripheral device being coupled to the inner tubular-member at a proximal end of the inner tubular-member when the peripheral device is engaged by the capture mechanism, the inner tubular-member being coupled to the sensing assembly at a distal end of the inner tubular-member.

32. (Cancelled)

33. (Previously Presented) The method of claim 30, wherein providing the sensing assembly includes:

providing a first pulley;

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providing a second pulley;
disposing a belt about the first pulley and the second pulley;
providing a guide rail; and
providing a carriage assembly coupled to a bellows and being configured to move along the guide rail in response to a corresponding movement of the peripheral device when engaged by the capture mechanism, the belt being configured to move in response to movement of the carriage assembly.